

## Non-Toxic HAN Monopropellant Propulsion, Phase II

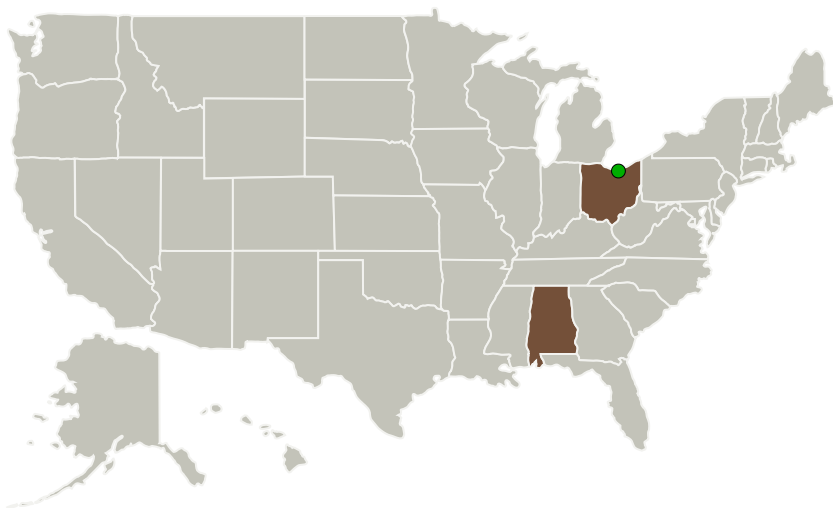
Completed Technology Project (2012 - 2015)



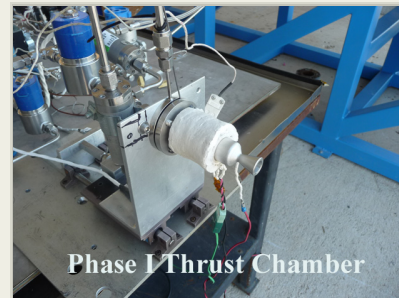
## Project Introduction

Non-toxic monopropellants have been developed that provide better performance than toxic hydrazine. Formulations based on hydroxylammonium nitrate (HAN) have superior performance as compared to hydrazine with Isp (261 seconds, 12% greater), higher density and volumetric impulse (60% greater density-impulse), lower melting point, and much lower toxicity (No self contained breathing apparatus required). HAN based monopropellants require higher chamber temperatures (2083K vs 883K) to combust. Current hydrazine based combustion chamber technology (Inconel or niobium C103 and silicide coating) and catalyst (Shell 405) are inadequate. However, current state of the art iridium lined rhenium chambers and innovative new foam catalyst were demonstrated in pulse and 10 second firings in the Phase I. The goal of the SBIR project is develop and test a flight weight thruster for an environmentally "green" monopropellant.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



Non-Toxic HAN Monopropellant Propulsion Project Image

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Images	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	2
Target Destinations	3

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

# Non-Toxic HAN Monopropellant Propulsion, Phase II

Completed Technology Project (2012 - 2015)



## Primary U.S. Work Locations

Alabama

Ohio

## Images



### Project Image

Non-Toxic HAN Monopropellant  
Propulsion Project Image  
(<https://techport.nasa.gov/image/133672>)

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

Carlos Torrez

### Principal Investigator:

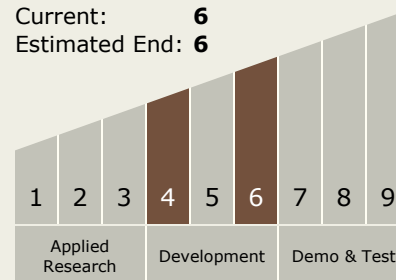
Timothy N Mckechnie

### Co-Investigator:

Timothy Mckechnie

## Technology Maturity (TRL)

Start: 4  
Current: 6  
Estimated End: 6



## Technology Areas

### Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.2 Earth Storable

## Non-Toxic HAN Monopropellant Propulsion, Phase II

Completed Technology Project (2012 - 2015)



### Target Destinations

The Sun, Earth, The Moon,  
Mars, Others Inside the Solar  
System, Outside the Solar  
System